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in forcing itself into the opening tends to depress such or such a pole of the adjacent utricular convexity. According to this compression, and according to the pole depressed, a circulation of the endolymph is caused in the utricule. This provokes corresponding currents in the semi-circular canals. These compensating currents vary in direction and intensity, depending on the direction of the displacement in the utricule, the pole depressed and the direction of incidence of the disturbance. The cristæ of the ampullæ perceive on opposite sides the direction and the intensity of these currents, which reconstitute in a manner the geometric description of the utricular disturbance. The nerve of the flat macula perceives the intensity of the disturbance which arrives diametrically from the convex wall, while the three nerves of the ampullæ analyze its direction. The so-called nerve of space is then only the nerve of disturbed space and of sonorous space. It defines the position of the points perceptible by the ear by means of the disturbance of the interposed medium. It localizes objectively the origin of auricular perceptions by the direction of the incidence of the disturbances.

E. W. SCRIPTURE.

SCHUMANN, *Ueber die Unterschiedsempfindlichkeit für kleine Zeitgrößen*, Zeitschrift für Psychologie und Physiologie der Sinnesorgane, 1891 II. 294.

The experiments were performed by the methods of right and wrong cases and the average errors. The clicks which gave the time interval were produced by the momentary passage of a current in a telephone. The closing of the current was done by contact with platinum points on a regularly revolving wheel. Time intervals from 0.15 sec. to 2 sec. were experimented upon by the method of right and wrong cases. The discriminative sensibility was found to be greatest for 0.3 to 0.4 of a second, a result in agreement with that of Mach. By the method of average errors experiments were tried upon intervals from 0.5 to 5 sec. This method, however, cannot be employed for solving this problem, because the average error is very great with intervals between 0.3 and 0.4 seconds, whereas, the discriminative sensibility was found to be finest at this point by the method of right and wrong cases. Moreover, comparison and reproduction of small time intervals are different operations.

BERGSTRÖM.

EPSTEIN, *Die logischen Principien der Zeitmessung*, Leipzig, 1887.

The author reviews the opinions of Newton, Locke and Leibnitz; and at the end of his article some of the recent mathematical definitions of equal times. He approaches the problem from the side of the theory of knowledge. Time is an auxiliary variable introduced by us into the phenomenal world to give order to its events or processes. Equal times are those in which identical events take place. But we have no criterion of identical events and must content ourselves with considering those events identical for which the contrary hypothesis would be less reasonable.

BERGSTRÖM.

METTLER, *Aural vertigo (Menière's Disease)*. Journ. Nerv. Ment. Dis. 1891 XVI. 19.

There is no sufficient reason for supposing that the semi-circular canals or any other definite organs are the seat of the sense of equilibrium. The feeling of equilibrium is due to the harmonious relations of the sensory centers to each other and to the motor centers connected with them. Any serious injury to the centers may bring about the mental confusion and motor ataxy which we call vertigo.

BERGSTRÖM.